Winter 2010

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Bulletin

A publication of the VIRGINIA NATIVE PLANT SOCIETY
Conserving wild flowers and wild places

www.vnps.org

"Our Mountain Roots" in Shenandoah National Park Annual Meeting 2010

VNPS members are invited to gather September 10-12 in Shenandoah National Park for the Annual Meeting 2010, hosted by the Piedmont Chapter. In keeping with the meeting's theme, "Our Mountain Roots," activities will highlight the park's cultural history as well as its plant communities. A variety of hikes will showcase varied ecosystems with their native plants, many still in bloom or fruit. Be ready for the challenge of sorting out asters and goldenrods, or spotting more elusive plants such as doll's eyes (*Actaea pachypoda*) or ladies' tresses *(Spiranthes spp)*. The Friday-night speaker, park botanist Wendy Cass, will describe efforts to preserve the park's botanical treasures. Accommodations are reserved at Skyland Resort. Members are encouraged to monitor the *Bulletin* and the website as more information and registration details become available.

Don't judge a book by its cover
The curious case of wild ginger pollination

What pollinates wild ginger? This seems like an easy question. The inconspicuous little flowers are held close to the forest floor, often completely hidden by a dense canopy of ginger leaves above. Flower color is rather drab, dominated by brown and maroon hues. Wind pollination seems completely unlikely and flowers pollinated by bees, butterflies, moths, or hummingbirds are always much more showy and accessible to these flying creatures. Flies, however, given their natural inclination to seek carrion as a food source for their babies (i.e. maggots), are often attracted to brown and maroon flowers. And because their actual quarry, animal carcasses, would be located on the ground, visiting a wild ginger flower could easily be perceived to be consistent with routine fly behavior. It seems obvious: wild ginger flowers sure look like they ought to be cross-pollinated by flies of some sort.

In fact, I remember being taught long ago that fungus gnats, a sort of fly, pollinate wild ginger, and, I am embarrassed to admit that I have passed along that half truth (really, less than half true) to more than one class of students. The general idea of fly-based pollination for wild ginger was widely repeated in floras and accounts of natural history prior to 1940, and a study of wild gingers and fungus gnats was published somewhat later (Vogel, 1978). These alleged gnat and fly pollinator theories have dispersed widely and now can be found infesting the Internet. It is not difficult to locate on the Web multiple iterations of and variations upon the wild ginger-fly / gnat story. Sometimes the story is embellished with wonderfully elaborate details: flies newly emerged in early spring allegedly encounter wild ginger flowers while searching for the thawing bodies of small mammals that failed to survive the preceding harsh winter. Often the story is told with the imprimatur

Wild Ginger
Asarum canadense
Illustration by
Nicky Staunton

(See Wild Ginger sex, page 6)

INSERT: VNPS 2010 Wildflower of the Year, Wild Ginger

From the president . . . . . .

Winter plant clues bring warm thoughts

While there's still snow cover here in mid-January, I've been spending a little more time inside. Oh the things you find! Yesterday it was a collection of plant parts, pretty dried up. What ARE these? Where did they come from? I really wasn't sure, but sat looking closely at them until it started to come back to me. A bit of the flowering part of skunk cabbage looking like something from another planet. A stem of flowers from a box elder, I think. The calyx of a stachys flower, purple on the tips and still stuffed with hairs. Some grass, no less a mystery now than when I first picked it! While we should all heed the rule of not picking on publicly owned lands and gardens, I sometimes come in with a handful of things from yard or roadside and have a closer look. Not only are the pieces interesting in themselves, and amazing because they keep some rather delicate looking parts, but you can shut your eyes and remember the feel of the air, or the smells associated with the day, and while away a cold morning thinking warm thoughts. A book I like for looking up off-season finds is ***Wildflowers in Winter,*** *by Carol Levine, although there are other good ones.*

There is plenty to look forward to in the coming spring, including another stimulating lineup of speakers at our Annual Workshop on March 6, the second official Invasive Removal Day on May 1 that we cosponsor with the Virginia Master Naturalists, and another week-long trip to Southwest Virginia beginning May 9. Please look for more information on the trip elsewhere in this newsletter, or contact the office for details.

I want to wish a warm welcome to new members, particularly those of you who received gift memberships last year. Thanks also to the members who gave those gifts. I hope you will like what we offer, both on the state level and in your chapter, and continue your association with us.

Your President, Sally Anderson

Join VNPS for a Southwest Va. botany-natural history foray

Set aside the week of May 9-14 for a trip of exploring and botanizing. This year's trip will include stops at Mount Rogers for a visit to the boreal forest of Virginia and a walk among the wildflowers. Doug Ogle has agreed to lead us on a trip to the ponds of Saltville. It is an area of much history, unique plant growth (can you believe saltwater plants?) and geologic wonder.

We will visit the Clinch Mountain Wildlife Management Area to see spectacular displays of larkspur and trillium as well as blue-eyed Mary (*Collinsia verna*). This area climbs 1,600 feet above the valley to offer beautiful views as well as a diversity of flora.

A drive through Burkes Garden in Tazewell County is always a treat. It is one of the most scenic areas in the Old Dominion. This is the highest valley in Virginia at 3,000 feet. For the birders this area offers waterfowl in the ponds and is home to the golden eagle. A drive through this area is as rural as it gets. The pastoral setting with the mountains looming above is spectacular.

Breaks Interstate Park is located in Dickinson County and spills over into Kentucky. This is the deepest canyon east of the Mississippi. The 4,500 acres of this park offer a wide variety of plant life including catawba rhododendron (*Rhododendron catawbiense*). The Russell Fork River offers fishing and whitewater rafting. We will spend the night in the lodge there and join a park ranger for a close-up look at a true Virginia treasure.

The drive between Breaks Interstate Park and Natural Tunnel State Park is quite scenic and includes a stop at Birch Knob where on a clear day six states can be seen from the tower. Once we arrive at Natural Tunnel we will see an incredible variety of plants. This was one of the highlights of the 2009 trip. If you are interested in geology, there are fossils found in the limestone rocks here. Natural Tunnels was dubbed the eighth wonder of the world by William Jennings Bryan.

More information is coming soon. Trip cost is $600 and includes lodging, guides, a $100 VNPS donation, and most breakfasts. Trip limit is 16. To reserve space, send a $100 deposit to the VNPS office. To learn more, contact Butch Kelly (butch2410@msn.com or 540- 384-7429).

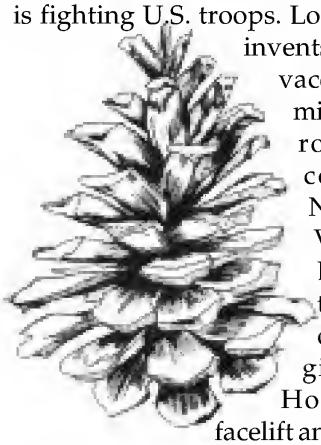
Globally rare ecosystem threatened by marina

Tucked in the far southeastern corner of Virginia, the Back Bay National Wildlife Refuge and its namesake, Back Bay, harbor a rich array of aquatic life and vibrant bird populations and draw anglers and birders year round. The shallow bay, averaging just four feet in depth, is ruled by the wind rather than lunar tides, making it a globally rare ecosystem. The bay has been designated an Aquatic Resource of National Importance by federal agencies, but that doesn't automatically protect it from harm.

In 2005, a Virginia Beach developer applied for a permit from the Army Corps of Engineers to build a 76-slip commercial marina in the bay just north of the wildlife refuge. The project would result in a significant increase in motorboat

(See Back Bay, page 8)

Bird bellies provide plant link



What do the following have in common? The Statue of Liberty arrives in New York Harbor. A patent is filed for the first roller coaster. Grover Cleveland becomes president of the United States. The Apache warrior, Geronimo, is fighting U.S. troops. Louis Pasteur invents the rabies vaccine. A 19-mile-long railroad track connecting Norfolk to Virginia Beach is two years old. The Virginia Beach Hotel gets a facelift and will soon reopen as the Princess Anne Hotel. The answer lies in the 19th century — the year 1885.

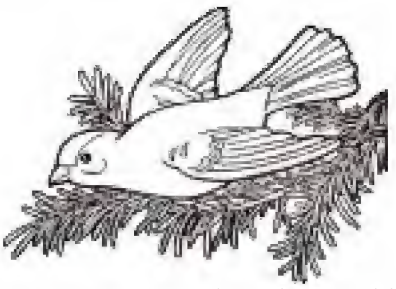
The Virginia landscape in 1885 was, in many places, a shadow of its former self. The long leaf pine had been logged to near extinction. Forests that greeted the early colonists had been cleared for homes, crops and pastures. Marshes and swamps had been drained to increase acreage for agriculture. George Washington had made a failed attempt a century earlier to wrestle land from the Great Dismal Swamp. Watershed quality had declined as soil erosion from farmlands clouded streams, rivers and bays.

All the while, wildlife was pushed from its native homes and forced to find new food and cover. Flocks of wild turkey moved out as jays, crows and starlings moved in. Cultivated crops of corn, oats, barley and wheat proved a boon for wildlife. Cleared forests created edges where grass, perennials and shrubs could grow and provide wildlife with seeds, fruit, insects and cover. The ivory-billed woodpecker and the passenger pigeon became extinct while other wildlife flourished and adapted to the ways of mankind.

The ability of wildlife to adjust and adapt to altered landscapes and introduced foodstuffs had long been of interest to field naturalists. The famous author of *Birds of America* (1827-1838), John James Audubon, shot the birds he posed and painted. He studied their stomach contents and noted foods eaten as "wild fruits and grains," "weed seeds" or "insect and plant materials." With scalpel, tweezers, pencil and journal in hand, Audubon became an early practitioner of studying bird food habits in a laboratory.

The traditional study of wildlife and food habits occurs in the field. The field naturalist needs a keen eye, patience and excellent recordkeeping skills. Henry David Thoreau is an early example. Weary after writing *Walden*, Thoreau embarked on a labor of love as he began to observe and record the goings-on of the native plants and wildlife near his home in Concord, Massachusetts. Thoreau writes of American chestnuts in the fall of 1850 that "the chestnuts are rattling out. The jays scream and the red squirrels scold while you are clubbing and shaking the trees." He found 35 chestnuts a mouse had stored in the rodent's gallery. Thoreau noted the fall chestnut harvest of 1852 "was more than the squirrels could consume."

Would that we could know what Thoreau did. The queen of the eastern forests fell victim to chestnut blight in 1904. The American chestnut was all but a memory by 1950. Thanks to Thoreau and his writings in *Wild Fruits*, we can wonder what it's like when "the chestnuts are rattling out."

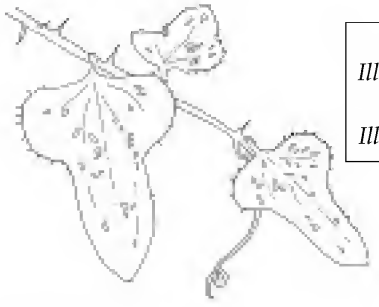


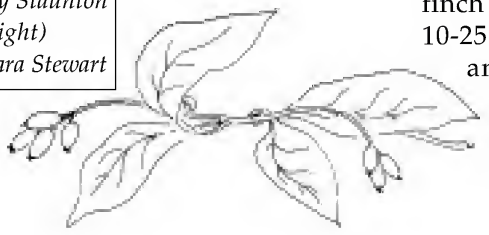
In 1885 the study of wildlife and their food habits became a mandate of the U.S. Department of Agriculture. Early research focused on wildlife food habits that could harm farmers' fields. It evolved to include the study of waterfowl, upland game birds, fur and game animals and other species. Fish and Wildlife Service record #1 was of a song sparrow shot in a marsh near Ossining, N.Y. at 6 p.m. on July 3, 1885. Its stomach contents were studied and recorded as 20 percent animal matter and 80 percent vegetable matter. Decades later, more than 250,000 records existed for birds plus thousands of records on mammals, reptiles and amphibians.

This vast reserve of federal food-habits data plus that gathered by state conservation and fish and game departments across decades is the backbone of a unique book titled *American Wildlife & Plants: A guide to Wildlife Food Habits*. This book was published in 1951 under the direction of the U.S. Fish and Wildlife Service, Department of the Interior, at the Patuxent Research Refuge, Laurel, Maryland. The authors who took on the challenging task of organizing, interpreting and publishing this data were biologist Alexander C. Martin, consultant Herbert S. Zim and Arnold L. Nelson, director of the Patuxent Research Refuge.

This book answers questions such as "What foods does the common goldfinch eat?" and "What foods do goldfinches prefer to eat?" The answer is that ragweed year-round is 10-25 percent of the goldfinch diet; thistle and sweet gum are 10-25 percent of its wintertime diet and shepherds-purse is 10-25 percent of its summertime diet. Goosefoot, sunflower, dandelion, velvet grass and alder are

(See Bird study, page 7)





***Greenbrier** (left)*
Illustration by Nicky Staunton
***Dogwood** (right)*
Illustration by Barbara Stewart

Flora of Virginia

A peek inside the pages . . .

The manuscript of the *Flora of Virginia* goes to the copy editor next January, so this year is the home stretch! Ecological review of completed family treatments is now under way, and authors are winding up the remaining family treatments, as measurements are verified in the herbarium with specimens collected in Virginia. We're also gearing up to collect plants on our most-wanted list for illustration this year. In late 2012, we'll have the *Flora* in hand.

We wanted you to have a preview of what the *Flora* is going to look like inside, so here (opposite) is a complete family treatment that will serve as a model 7 x10-inch page. We picked a family — the Annonaceae — with only two representatives in the state, which lets us present a whole family treatment on one page. This treatment is not final, and there will probably be a few tweaks to the format.

Let's have a look. A family treatment will begin with the prominent display of the **family** name, its authority, and its common name. This is followed by the family description (**D**) and the references (**R**) used in the family's taxonomy and description. The taxa within a family will be presented genus by genus, alphabetically. For families with more than one genus in Virginia, there will be a **dichotomous key to the genera,** but for the Annonaceae, we have only one genus, *Asimina*. A **genus** name is also presented prominently, with its authority and common name. The genus is then described (**D**) and references (**R**) given.

Next comes the **dichotomous key to the species** in the genus; in Virginia, there are two species in *Asimina*. The key is followed by a full description of each species, presented in alphabetical order. A **species description** includes authority, common names, and synonymy, keyed to references, which are coded to save space (for example, C = *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, by Henry A. Gleason and Arthur Cronquist; F = *Gray's Manual of Botany*, by Merritt Lyndon Fernald; FNA = *Flora of North America*; and RAB = *The Manual of the Vascular Flora of the Carolinas*, by Albert E. Radford, Harry E. Ahles and C. Ritchie Bell). Then come the morphological description of the species (**D**), phenology information (**P**), habitat information (**H**), status (**S**), and any comments about the species (**C**).

More than 3,500 taxa will be keyed and described in the *Flora of Virginia*, and 1,400 taxa will be illustrated with drawings commissioned especially for this book. *The Flora* will be a hefty 1,400 pages long and will include a history of botanical exploration in Virginia, a discussion of the plant communities in the commonwealth, and a glossary.

This is an exciting time, made even more so by the terrific support we have received from the Virginia Native Plant Society, its chapters, and, individually, its members. While our fundraising lagged a bit last year compared with 2008, we did better than we had anticipated, given the recession. This serves as our springboard for raising the $250,000 we need to make the Flora Project succeed. You can find information about the Flora Project and our sponsorship programs on our website, floraofvirginia.org, or call me at 804-371-5561. Once again, VNPS has designated the Flora Project as the recipient of its annual giving campaign. An appeal letter should arrive in your mailbox soon.

Bland Crowder, associate director and editor, Flora of Virginia Project

Flower Camp to offer Nature Journaling Workshop

Seeing nature in a new light will be the focus of the Nature Journaling Workshop to be held April 30 to May 2 at Nancy Ross Hugo's Flower Camp in Howardsville. Participants will learn to observe and record natural phenomena in new ways with artist Rhonda Roebuck, who returns to the Flower Camp setting overlooking the James River to lead her fifth workshop there. As always, Rhonda will not only share what she has learned from her own lifetime of journaling but also coach campers in new and interesting ways to record what they see. Rhonda will demonstrate interesting ways to alter digital images, play with paint, and experiment with drawing (even if you can't draw), but her emphasis during this workshop will be less on embellishing the journal page than on improving seeing. Rhonda's usual smorgasbord of materials will be available for campers to use, but this year participants will spend more time outdoors practicing techniques that enhance seeing rather than indoors working on journal pages. Camp director Hugo will be on hand to lead forays into the woods and gardens around Flower Camp, pointing out early spring tree traits, among other things. Tuition of $375 includes five meals (dinner Friday through brunch Sunday), two nights' lodging, instruction, and most materials. For more information, contact Hugo at 2047 Selma Road, Howardsville, VA 24562; nancyhugo@comcast.net; or 804-798-6364.

Linden tree journal page by Rhonda Roebuck.

ANNONACEAE A.L. de Jussieu 1789 Custard-apple Family

A family of 128–130 genera and 2,200–2,300 species, mostly tropical. D Vines, shrubs, or trees to 15 m; buds naked; leaves alternate, entire, simple, pinnately veined, obovate, acuminate, with cuneate bases, short-petiolate, exstipulate, malodorous when crushed. Flowers perfect, regular, axillary, solitary on short pedicels, hypogynous; sepals 3, distinct or basally connate; corolla of 6 thickish petals in two whorls, purple or purplish green, valvate in the bud; stamens numerous, distinct, spirally arranged, anthers adnate, extrorse, filaments very short, connective often prolonged; pistils several to many on flat to conical or subglobose receptacle, free and distinct or cohering in a mass; ovaries superior, ovules 1–many. Fruits fleshy or pulpy aggregates of berrylike structures, sometimes coalescent, aromatic when mature; berrylike structures ellipsoid, obovoid, or torulose, usually indehiscent, stipitate; seeds 1–several, large, brown, anatropous, compressed, ellipsoid-ovoid, embryo minute, at base of ruminated endosperm. R Kessler in Kubitzki, Rohwer, and Bittrich (1993).

Asimina Adanson 1763 Pawpaw

A genus of 8 species endemic to e. North America. D Shrubs or small trees, taprooted; trunks straight in arborescent forms. Bark thin; lenticels scattered, small, prominent; buds naked. Leaves deciduous, alternate, obovate, cuneate at base, acuminate, entire, short-petiolate, exstipulate, malodorous when crushed. Inflorescences axillary fascicles on new shoots or from above leaf scars of previous seasons; peduncles bracteate or bracteolate. Flowers solitary on short pedicels, 1–4 per fascicle, nodding to nearly erect, perfect, regular. Sepals 3–4, soon deciduous, nearly distinct, triangular to deltate-ovate, valvate in bud. Petals usually 6, purple or purplish green, in 2 unequal series of mostly 3 equal members, the outer set imbricate, larger, thinner than the valvate inner set; nectaries present. Stamens numerous, short-columnar, forming ball; filaments short. Pistils 1–15, usually only 1–3 maturing, distinct, glabrate. Ovaries superior, 1- to many-ovulate; ovules several, or many in 2 staggered rows. Fruits aggregates of separate berrylike structures, fleshy, aromatic; seeds 1–many per pistil, brown, bean-shaped. R Kral (1960)=Z; Wilbur (1970a)=Y; Godfrey (1988)=X; Kral in FNA (1997); Ward (2001); Kessler in Kubitzki, Rohwer, and Bittrich (1993).

1. Flowering pedicels 3–8 mm long, the hairs tan to rusty; leaves 6–15 (–20) cm long; sepals 4–7 mm long, outer petals 10–13 mm long; fruit 1–3 (–6) cm long, plant a shrub to 2 m (rarely to 5 m) tall (Coastal Plain) ..... *A. parviflora*

1. Flowering pedicels (10–) 15–20 (–25) mm long, the hairs dark reddish-brown; leaves 15–35 cm long, sepals 8–12 mm long, outer petals 15–25 mm long; fruit (3–) 7–15 cm long; plant a tree to 15 m tall (widespread) ..... *A. triloba*

Asimina parviflora (Michaux) Dunal; Small-flowered Pawpaw, Small-fruited Pawpaw. [= C, F, FNA, G, K, RAB, S, W, WH, X, Y, Z] D Shrubs to 4 m; twigs rusty pubescent. Leaves 6–20, to 10 cm, obovate to oblong-obovate, gradually narrowed below to cuneate or rounded bases, abruptly short-acuminate to acute at tips, glabrate to glabrous above, permanently rusty-pubescent beneath; petioles 4–7 mm, channeled. Flowers 1.2–2 cm wide, axillary, appearing with the leaves, dark purple or brown; pedicels 1–8 mm, tomentulose; petals impressed-veiny, oblong or ovate. Fruits berries, 1–3 (–6) × 1–1.5 cm, pulpy; seeds 1–1.5 cm. P Apr–May; Jul–Sep. H Dry pinelands; sandy oak woods and bluffs. S Rare, Coastal Plain south of the James River. C A scaled-down version of *A. triloba*, inhabiting drier, sandy habitats.

Asimina triloba

Asimina triloba (Linnaeus) Dunal; Common Pawpaw, Indian-banana. [= C, F, FNA, G, K, RAB, S, W, WH, X, Y, Z] D Shrubs or trees to 15 m; young twigs rusty-pubescent; bark brown, nearly smooth. Leaves 15–35 × 5–15 cm, obovate-oblong to lanceolate, gradually narrowed below to cuneate or rounded bases, abruptly short-acuminate to acute at tips, glabrous or glabrate above, permanently rusty-pubescent beneath; petioles 3–10 mm, channeled. Flowers 2.5–4 cm wide, axillary, appearing with the leaves, dark purple to brown; pedicels 8–30 mm, hairy; petals impressed-veiny, the unequal outer ones broadly ovate to orbicular, spreading, the inner ones slightly shorter than the outer, ovate, nearly erect. Fruits berries, 3–15 × 1.5–5 cm, pulpy; seeds 1.6–3.3 cm. P Mar–May; Aug–Oct. H Moist, rich, often alluvial forests. S Common throughout.

Wild Ginger sex not as it seems

(Continued from page 1)

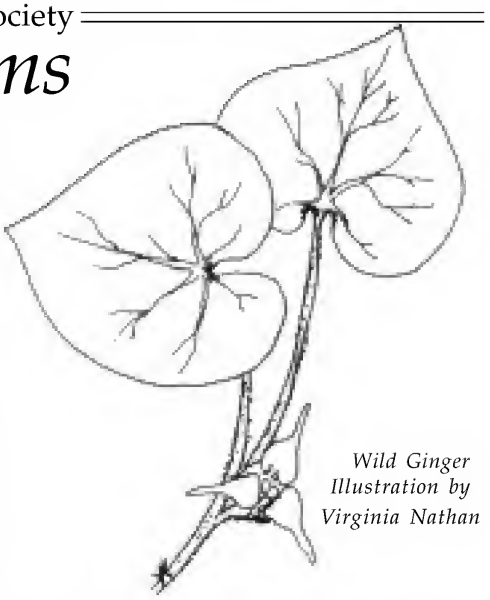
of authority, like a certain PowerPoint lecture that can be downloaded from a major university located somewhere in the Midwest (I'm not telling which, but it is not hard to find) in which the wild ginger of eastern North America (*Asarum canadense*) is a featured example of fly-mediated pollination. Flies and wild ginger make a great and convincing story, but it's not the whole truth!

Some of the first chinks in the wild ginger-fly story appeared in a 1940 article by Donald Culross Peattie titled, "How is *Asarum* pollinated?" Peattie's article summarizes earlier literature and recounts his own observations of multiple species of *Asarum* and *Hexastylis* in their native habitats in North Carolina and California. Peattie's main points are: 1) earlier published accounts of wild ginger-fly interactions are mere assertions not accompanied by data, 2) prior to 1940, at least two detailed studies, one in Europe and one in Alabama, failed to record any insect visitors to wild ginger flowers, and 3) wild ginger flowers emit no detectable odor at all, whereas bona fide fly-pollinated flowers are typically foul-smelling, sometimes in the extreme. Peattie ends with a plea for well-documented studies of wild ginger pollination.

Since Peattie's article, a few detailed studies of wild ginger have been published. The consensus emerging from several studies since the 1980s is that wild ginger flowers are self-pollinated (these are well summarized in Kelly 1997, 2001). The evidence is compelling: intact flowers that are carefully bagged to prevent access by insects set seeds at rates equivalent to untouched control flowers while flowers that are carefully emasculated (anthers removed before pollen is mature) but left uncovered (i.e., available to potential insect visitors) produce very few seeds. The evidence shows that self-pollination predominates and cross-pollination is rare.

In the case of *Asarum canadense* and closely related species, the details of self-pollination are fascinating. As soon as the flowers open, stigmas are receptive but the pollen is not initially located nearby because the stamen filaments (stalks) are bent to a position parallel with the base of the floral cup. Over a period of several hours to several days, filaments straighten, bringing the pollen-bearing anthers into proximity with the stigmas. Cross-pollination would be possible if an insect visitor brought pollen to a flower shortly after opening, but it seems that insect visits of any kind are rare, and most seeds form as a result of delayed autonomous self-pollination brought about by reorientation movements of the stamens. At present, documentation of a minor role for cross-pollination by gnats or flies rests with some of the western U.S. species of *Asarum*. *Asarum hartwegii* emits a faint musty floral fragrance (Mesler & Lu, 1993) and mushroom flies are reported to lay eggs in the flowers of several western species (Meeuse & Morris, 1984). But, our eastern wild ginger, *Asarum canadense*, seems to be overwhelmingly self-pollinated.

The story for the closely related wild gingers sometimes classified in the genus *Hexastylis* is a bit different. In these plants the stamens are short, their anthers are located well below the stigmas, and their filaments undergo



Wild Ginger Illustration by Virginia Nathan

no repositioning movements. The distance between anthers and stigmas is too great for easy direct self-pollination. For the few species studied, it seems that a variety of small insects visit flowers of *Hexastylis* and, while scrambling around inside, move pollen from anther to stigma, but these pollination events are overwhelmingly within the same flower, not crosses between different flowers (Otte, 1977).

So, things are not always as they seem. Wild gingers look like they ought to be cross-pollinated by flies but the best available evidence is that only some species are and then only some of the time; self-pollination, whether autonomous (in *Asarum*) or insect-assisted (in *Hexastylis*) appears to be the norm for these curious plants.

References cited: **1)** Kelly, L. M. 1997. "A cladistic analysis of *Asarum* (Aristolochiaceae) and implications for the evolution of herkogamy." *Amer. J. Bot.* 84: 1752-1765. **2)** Kelly, L. M. 2001. "Taxonomy of *Asarum* section *Asarum*." *Syst. Bot.* 26: 28-53. **3)** Meeuse, B., & S. Morris. 1984. *The Sex Life of Flowers*. Faber, London. **4)** Mesler, M. R., & K. I. Lu. 1983. "A re-evaluation of the green-flowered *Asarum* (Aristolochiaceae) from southern Oregon." *Brittonia* 35: 331-334. **5)** Otte, D. 1977. "The pollination biology of *Hexastylis arifolia* (Michx.) Small var. *arifolia* and *H. minor* (Ashe) Blomquist (Aristolochiaceae) in the area of Chapel Hill, North Carolina." master's thesis, University of North Carolina, Chapel Hill. **6)** Peattie, D. C. 1940. "How is *Asarum* pollinated?" *Castanea* 5: 24-29. **7)** Vogel, S. 1978. "Pilzmückenblumen als Pilsmimeten." *I. Flora* 167: 329-366.

W. John Hayden, VNPS Botany Chair

Master Naturalists accepting applications

Applications are now being accepted for the Arlington Master Naturalist Program that starts this fall. Make a difference by becoming a Master Naturalist volunteer!

For information and to complete an application for the Arlington program, visit the Arlington Regional Master Naturalist website at www.armn.org. For additional questions, please email arlingtonmasternaturalist@gmail.com. Training programs are also starting all across the state. For information about the statewide program and for chapters in other parts of the commonwealth, visit www.virginiamasternaturalist.org.

The Virginia Master Naturalist Program is a statewide volunteer corps providing education, outreach, and service

(See State naturalists, page 8)

•Bird study

(Continued from page 3)

2-5 percent of the goldfinch diet, depending on the time of year. The data also show that summer, fall and winter seeds make up 96, 99 and 97 percent, respectively, of their diet. Its spring diet is 49 percent animal food such as insects and 51 percent plant food. This is outstanding information for anyone who wants to attract goldfinches to the landscape!

The book also answers questions such as "What wildlife utilizes sweet gum for food?" and "To what extent does wildlife prefer sweet gum for food?" The answers are "mallard ducks, bobwhite quail, Carolina chickadees, juncos, white-throated sparrows, towhees, Carolina wrens and the eastern chipmunk eat sweet gum seeds as .5 to 2 percent of their diets; goldfinches 5-10 percent, squirrels 2-5 percent and beaver (seeds and wood) 10-25 percent of their diet. The authors remark that "this plant is used to only a small extent by wildlife." This is excellent information! It helps a landscaper decide whether or not to include a native sweet gum tree in a landscape design or restoration project.

Duck hunters might be interested in the aquatic and marsh section, where the food habits of specific waterfowl are listed. Fur and game animals are listed with their food preference data. All this information can be used to help invite wildlife home by planting favorite foods. Cultivated plants such as corn, wheat and barley have their own sections with wildlife and food habit data.

This information stands the test of time. Bird food habits and woody plant preferences should be about the same in 2010 as in 1951. The only difference might be that the number of invasive plants as a percentage of wildlife diet may have increased as invasives have secured a stronger hold on the native landscape.

The chapter that brings closure to this article is titled "Wildlife Plants Ranked According to their Value." Songbirds are the greatest part of each plant value but the ranks also consider water, marsh, shore and upland game birds, fur, game and small mammals and browsers. The plants are listed by common name. Field and lab limitations made it difficult to drill down past genus to identify plant species.

The woody plants that rank from 1 to 20 for their wildlife value in the southeast region of U.S., including Virginia's piedmont and coastal plain, are in *descending* order: oak, pine, blackberry, wild cherry, greenbrier, grape, blueberry, hickory, black gum, holly, poison-ivy, beech, maple, Virginia-creeper, persimmon, wax myrtle, dogwood, mulberry and tulip tree.

The woody plants that rank from 1 to 20 for their wildlife value in the northeast region of the U.S. are in *descending* order: oak, blackberry, wild cherry, pine, dogwood, grape, maple, beech, blueberry, birch, sumac, aspen, spruce, hickory, fir, alder, poison-ivy, black gum, mulberry and elm.

When cross-referenced with Douglas W. Tallamy's *List of Woody Plants Ranked by Ability to Support Lepidoptera Species* (Bringing Nature Home, 2007) the following are truly dual-purpose, highly beneficial native plants: oak, wild cherry, blueberry, maple, pine, hickory and beech. In all categories, the mighty oak comes out on top. The U.S. Forest Service *Silvics Manual* honors the white oak, *Quercus alba*, as "an outstanding tree of all trees."

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The deadline for the next issue is **March 1.**

• *Back Bay*

(Continued from page 2)

traffic, which would disturb sensitive marsh birds and other wildlife and threaten the recovery of the bay's submerged grasses — critical for maintaining water quality and providing food and shelter for fish and birds. Propellers can easily get entangled in and destroy underwater grasses in the shallow bay.

Hundreds of local fisherman and other residents have consistently opposed the project, and the U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service, which manages the refuge, recommended against the permit, the wildlife agency saying the marina would pose "substantial and unacceptable" impacts to the bay. The Virginia Department of Game and Inland Fisheries also expressed grave concerns about impacts of the project on wildlife, aquatic grasses, and water quality.

However, after conducting only a minimal environmental assessment, the Army Corps of Engineers issued the permit in 2008, saying that its no-wake-zone policy, instituted in part of the bay in 2006, would protect the refuge — even though it acknowledged it had not enforced the no-wake-zone policy and it did not have the money to do so.

In December, the Southern Environmental Law Center, on behalf of Friends of Back Bay and Back Bay Restoration Foundation, filed suit in U.S. District Court in Washington, D.C., challenging the permit for failing to meet requirements of the Clean Water Act and other laws.

Article taken from the Southern Environmental Law Center website. See www.southernenvironmental.org for more information or to read the entire case.

Botanical field meeting set

The 2010 Joint Field Meeting of the Botanical Society of America (Northeastern Section), Torrey Botanical Society, and the Philadelphia Botanical Club will explore the botany of Berkshire County, Mass., from June 20 to 24. Participants will stay at Buxton School in the heart of Williamstown, Mass.

Field trips, by bus, will include Mount Greylock, the highest mountain in Massachusetts with its own unique subalpine boreal forest and Bartholomew's Cobble, a National Natural Landmark noted for its great fern species diversity.

The cost is $350 including four nights' lodging and meals from Sunday night through Thursday breakfast. Without room, price is $225. For information contact Chair Nan Williams at nnwrowe@gmail.com or 413-339-5598.

• State naturalists

(Continued from page 6)

dedicated to the beneficial management of natural resources and natural areas within their communities. It is jointly sponsored by Virginia Cooperative Extension, the Virginia Department of Conservation and Recreation, the Virginia Department of Forestry, the Virginia Department of Game and Inland Fisheries and the Virginia Museum of Natural History.

Interested Virginians become Master Naturalists through training and volunteer service.The process for becoming a certified Virginia Master Naturalist typically takes 6 to 12 months. One starts by completing a 40-hour basic training course offered by a local chapter. An additional 8 hours of advanced training are also required. An important part of the certification process is the required 40 hours of volunteer service.

Virginia Master Naturalist programs and employment are open to all, regardless of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. An equal opportunity/affirmative action employer.